work with a plasma being carried out in a first etching process, and trenches (21') being formed by anisotropic etching in the region of the lateral recesses (21); at least one separating layer (12, 14, 14', 16) being buried between the first silicon layer (15) and a further silicon layer (17, 17'), and the first etching process coming at least almost to a standstill upon reaching the at least one separating layer; and the separating layer (12, 14, 14', 16) subsequently being etched through in an exposed region (23, 23') by a second etching process, and a third etching process then etching the further silicon layer (17, 17'); wherein a first and a second section (12, 14) of the separating layer (12, 14, 14', 16) are deposited in such a manner, that the conducting layer (13) is completely enclosed.

33. (New) A method for etching a silicon layered body, which has a first silicon layer (15) that is provided with an etching mask (10) for defining lateral recesses (21); work with a plasma being carried out in a first etching process, and trenches (21') being formed by anisotropic etching in the region of the lateral recesses (21); at least one separating layer (12, 14, 14', 16) being buried between the first silicon layer (15) and a further silicon layer (17, 17'), and the first etching process coming at least almost to a standstill upon reaching the at least one separating layer; and the separating layer (12, 14, 14', 16) subsequently being etched through in an exposed region (23, 23') by a second etching process, and a third etching process then etching the further silicon layer (17, 17'); wherein a $(CF_2)_n$ film (20) being built up on side walls of the trenches (21') at least one of in the course of the first etching process, prior to the third etching process and during the third etching process.

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34. (New) A method for etching a silicon layered body, which has a first silicon layer (15) that is provided with an etching mask (10) for defining lateral recesses (21); work with a plasma being carried out in a first etching process, and trenches (21') being formed by anisotropic etching in the region of the lateral recesses (21); at least one separating layer (12, 14, 14', 16) being buried between the first silicon layer (15) and a further silicon layer (17, 17'), and the first etching process coming at least almost to a standstill upon reaching the at least one separating layer; and the separating layer (12, 14, 14', 16) subsequently being etched through in an exposed region (23, 23') by a second etching process, and a third etching process then etching the further silicon layer (17, 17'); wherein one of an isotropic plasma-etching process

and an isotropic etching process with etching gases selected from the group xenon difluoride, chlorine trifluoride, bromine trifluoride, and iodine pentafluoride is used as a third etching process.

35. (New) A method for etching a silicon layered body, which has a first silicon layer (15) that is provided with an etching mask (10) for defining lateral recesses (21); work with a plasma being carried out in a first etching process, and trenches (21') being formed by anisotropic etching in the region of the lateral recesses (21); at least one separating layer (12, 14, 14', 16) being buried between the first silicon layer (15) and a further silicon layer (17, 17'), and the first etching process coming at least almost to a standstill upon reaching the at least one separating layer; and the separating layer (12, 14, 14', 16) subsequently being etched through in an exposed region (23, 23') by a second etching process, and a third etching process then etching the further silicon layer (17, 17'); wherein the first silicon layer (15) is made of epipolysilicon, which is at least one of doped on the surface, metallized on the surface and patterned.

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36. (New) A method for etching a silicon layered body, which has a first silicon layer (15) that is provided with an etching mask (10) for defining lateral recesses (21); work with a plasma being carried out in a first etching process, and trenches (21') being formed by anisotropic etching in the region of the lateral recesses (21); at least one separating layer (12, 14, 14', 16) being buried between the first silicon layer (15) and a further silicon layer (17, 17'), and the first etching process coming at least almost to a standstill upon reaching the at least one separating layer; and the separating layer (12, 14, 14', 16) subsequently being etched through in an exposed region (23, 23') by a second etching process, and a third etching process then etching the further silicon layer (17, 17'); wherein, after the third etching process, a $(CF_2)_n$ film (20) is deposited on at least one of a portion of the freely accessible silicon surfaces and freely accessible silicon-oxide surfaces.

37. The method as recited in Claim 36, wherein the $(CF_2)_n$ film (20) is initially deposited on all of the at least one of the accessible silicon surfaces and the silicon-oxide surfaces, and it is subsequently removed from all of the at least one of the

silicon surfaces and the silicon-oxide surfaces accessible for perpendicular ion incidence.

38. The method as recited in Claim 36, wherein, during the deposition of the $(CF_2)_n$ film (20), ionic bombardment is used which prevents the formation of the film (20) on all locations accessible for perpendicular ion incidence.

39. (New) A method for etching a silicon layered body, which has a first silicon layer (15) that is provided with an etching mask (10) for defining lateral recesses (21); work with a plasma being carried out in a first etching process, and trenches (21') being formed by anisotropic etching in the region of the lateral recesses (21); at least one separating layer (12, 14, 14', 16) being buried between the first silicon layer (15) and a further silicon layer (17, 17'), and the first etching process coming at least almost to a standstill upon reaching the at least one separating layer; and the separating layer (12, 14, 14', 16) subsequently being etched through in an exposed region (23, 23') by a second etching process, and a third etching process then etching the further silicon layer (17, 17'); wherein the separating layer (12, 14, 14', 16) is made of at least one first separating-layer section (12) and one second separating-layer section (16); the first separating-layer section (12) containing at least one of silicon dioxide, another silicon oxide, silicon nitride, glass, a ceramic, and a mixture thereof, and being deposited using deposition methods known from semiconductor technology; the second separating-layer section (16) preferably being a silicon-dioxide layer; and the first separating-layer section (12) being deposited on the further silicon layer (17), a conducting layer (13) preferably made of conductive, highly doped polysilicon then being deposited and possibly patterned on at least some regions of the first separating-layer section, and the second separating-layer section (16) subsequently being deposited on the conducting layer (13).

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40. (New) A method for etching a silicon layered body, which has a first silicon layer (15) that is provided with an etching mask (10) for defining lateral recesses (21); work with a plasma being carried out in a first etching process, and trenches (21') being formed by anisotropic etching in the region of the lateral recesses (21); at least one separating layer (12, 14, 14', 16) being buried between the first silicon layer (15) and a further silicon layer (17, 17'), and the first etching process coming at least almost to a standstill upon reaching the at least one separating layer; and the separating layer (12, 14, 14', 16) subsequently being etched through in an exposed region (23, 23') by a second etching process, and a third etching process then etching the further silicon layer (17, 17'); wherein the separating layer (12, 14, 14', 16) is made of at least one first separating-layer section (12) and one second separating-layer section (16), the first separating-layer section (12) containing at least one of silicon dioxide, another silicon oxide, silicon nitride, glass, a ceramic, and a mixture thereof, and being deposited using deposition methods known from semiconductor technology, and the second separating-layer section (16) preferably being a silicon-dioxide layer; and the separating-layer sections (12) and (16) each have a thickness of 500 nm to 50 μm, preferably 1 μm to 10 μm.

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41. (New) A method for etching a silicon layered body, which has a first silicon layer (15) that is provided with an etching mask (10) for defining lateral recesses (21); work with a plasma being carried out in a first etching process, and trenches (21') being formed by anisotropic etching in the region of the lateral recesses (21); at least one separating layer (12, 14, 14', 16) being buried between the first silicon layer (15) and a further silicon layer (17, 17'), and the first etching process coming at least almost to a standstill upon reaching the at least one separating layer; and the separating layer (12, 14, 14', 16) subsequently being etched through in an exposed region (23, 23') by a second etching process, and a third etching process then etching the further silicon layer (17, 17'); wherein the separating layer (12, 14, 14', 16) is made of at least one first separating-layer section (12) and one second separating-layer section (16), the first separating-layer section (12) containing at least one of silicon dioxide, another silicon oxide, silicon nitride, glass, a ceramic, and a mixture thereof, and being deposited using deposition methods known from semiconductor technology, and the second separating-layer section (16) preferably being a silicon-dioxide layer; and, in the vicinity of at least one of trench (21') and an exposed

structure (32), at least one of the first and the second separating-layer section (12, 16) are one of thinned by etching back to an etched-back separating-layer section having a thickness of 10 nm to 100 nm, and completely removed and, instead, a third separating-layer section (14) is grown, which has a lesser thickness and is preferably made of silicon dioxide.

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42. (New) A method for etching a silicon layered body, which has a first silicon layer (15) that is provided with an etching mask (10) for defining lateral recesses (21); work with a plasma being carried out in a first etching process, and trenches (21') being formed by anisotropic etching in the region of the lateral recesses (21); at least one separating layer (12, 14, 14', 16) being buried between the first silicon layer (15) and a further silicon layer (17, 17'), and the first etching process coming at least almost to a standstill upon reaching the at least one separating layer; and the separating layer (12, 14, 14', 16) subsequently being etched through in an exposed region (23, 23') by a second etching process, and a third etching process then etching the further silicon layer (17, 17'); wherein the depth of the trenches (21') etched in the first etching process is independent of the ratio of the width to the height of the trenches (21'), and is adjusted by the etching time for reaching the exposed regions (23, 23') of one of the first separating-layer section (16), the grown, third separating-layer section (14), and the further separating layer (14').

43. (New) A method for etching a silicon layered body, which has a first silicon layer (15) that is provided with an etching mask (10) for defining lateral recesses (21); work with a plasma being carried out in a first etching process, and trenches (21') being formed by anisotropic etching in the region of the lateral recesses (21); at least one separating layer (12, 14, 14', 16) being buried between the first silicon layer (15) and a further silicon layer (17, 17'), and the first etching process coming at least almost to a standstill upon reaching the at least one separating layer; and the separating layer (12, 14, 14', 16) subsequently being etched through in an exposed region (23, 23') by a second etching process, and a third etching process then etching the further silicon layer (17, 17'); wherein, in an oxygen-plasma stripper, the etched silicon-layer body is freed from the etching mask (10) and remaining $(CF_2)_n$ films (20), using an oxygen ashing process, and a $(CF_2)_n$ coating is subsequently deposited on the side walls of a produced, free-standing structure (32), on the side walls of the

trenches (21'), and on all of the surfaces shadowed by normal ionic incidence, in the course of which electrical contact surfaces, in particular, remain free from a $(CF_2)_n$ coating.

44. (New) The method as recited in claim 32, wherein the third etching process produces a completely isotropic undercut, at least between two trenches (21'), so that a free-standing structure (32) is formed.

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45. (New) The method as recited in claim 32, wherein the first etching process is a dry etching process in which deposition steps are carried out in alternation with isotropic etching steps known per se, a deposition gas, preferably one of octafluorocyclobutane C_4F_8 and perfluoropropylene C_3F_6, which supplies polymer-forming monomers, being exposed during the deposition steps to a highly dense plasma, particularly one of a PIE plasma (propagation ion etching) and an ICP plasma (inductively coupled plasma), which builds up a $(CF_2)_n$ film on the side walls of the trenches (21'); and an etchant gas, in particular sulfur hexafluoride SF_6 with admixed oxygen, which supplies fluorine articles, is used during the etching processes.

46. (New) The method as recited in claim 32, wherein the first, anisotropic etching process of the trenches (21') has a high selectivity with respect to silicon dioxide.

47. (New) The method as recited in claim 32, wherein the separating layer (12, 14, 14', 16) is made of at least one first separating-layer section (12) and one second separating-layer section (16), the first separating-layer section (12) containing at least one of silicon dioxide, another silicon oxide, silicon nitride, glass and a ceramic and being deposited using deposition methods known from semiconductor technology, and the second separating-layer section (16) preferably being a silicon-dioxide layer.

48. (New) The method as recited in claim 32, wherein the second etching process for etching through the separating layer (12, 14, 14', 16) in the exposed region (23, 23') of the trenches (21') is implemented in a dry-chemical manner, preferably using plasma etching.

49. (New) The method as recited in claim 48, wherein the plasma etching is carried out under strong ion bombardment, and with the aid of an etching gas selected from the group consisting of CF_4, C_2F_6, C_3F_8, CHF_3, C_3F_6 and C_4F_8.

50. (New) The method as recited in claim 32, wherein the second etching process for etching through the separating layer (12, 14, 14', 16) in the exposed region (23, 23') of the trenches (21') is implemented in a wet-chemical manner, and particularly with the aid of one of dilute hydrofluoric acid and dilute hydrofluoric-acid.

51. (New) The method as recited in claim 44, wherein the free-standing structure (32) has a base (30), which is at least largely free of an etchant tack during etching, particularly during the undercutting in the third etching process.

52. (New) The method as recited in claim 32, wherein one of prior to and during the third etching process, the side walls of the trenches (21') are selectively coated with a plasma polymer, prior to the undercutting, in order to produce a $(CF_2)_n$ film (20).

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53. (New) The method as recited in claim 33, wherein the first and second separating-layer sections (12, 16) are deposited in such manner that the conducting layer (13) is completely enclosed.

54. (New) The method as recited in claim 39, wherein the second separating-layer section (16) is deposited from the vapor phase, in particular by decomposition of silanes.

55. (New) The method as recited in claim 39, wherein the first separating-layer section (12) is formed from thermally grown silicon dioxide.

56. (New) The method as recited in claim 41, wherein the third separating-layer section (14) is produced with a thickness of 10 nm to 100 nm.

57. (New) The method as recited in claim 41, wherein the first silicon layer (15) is grown on the second separating-layer section (16) and one of the etched-back separating-layer section and the grown, third separating-layer section (14).

58. (New) The method as recited in Claim 41, wherein the second separating-layer section (16) is thicker, in particular more than ten times to one thousand times thicker, than one of the etched-back separating-layer section and the third separating-layer section (14).

59. (New) The method as recited in claim 32, wherein a plated surface of the first silicon layer (15) is an aluminum contact layer, which is protected from the attack of fluorine-containing gases by a photo resist mask as etching mask (10).

60. (New) The method as recited in claim 32, wherein the depth of the trenches (21') etched in the first etching process is independent of the ratio of the width to the height of the trenches (21'), and is set by the etching time for reaching the exposed regions (23, 23') of one of the first separating-layer section (16), the grown, third separating-layer section (14), and the further separating layer (14').

61. (New) The method as recited in claim 32, wherein all of the etching processes are carried out in a single etching chamber and the silicon layered body remains in the etching chamber during the etching process.

62. (New) The method as recited in claim 33, wherein the etching mask (10) and the remaining $(CF_2)_n$ films (20) are finally removed from the etched silicon layered body in an oxygen plasma stripper, using an oxygen ashing process.

63. (New) The method as recited in claim 62, wherein, after the removal of the remaining $(CF_2)_n$ films, a $(CF_2)_n$ coating is applied to the side walls of the free-standing structure (32), the side walls of the trenches (21'), and all surfaces shadowed by normal ionic incidence, in the course of which electrical contact surfaces, in particular, remain free from a $(CF_2)_n$ coating.

64. (New) The method as recited in claim 57, wherein, prior to growing the first silicon layer (15) on one of the grown, third separating-layer section (14) and the etched-back separating-layer section, an intermediate layer (17'), which forms the further silicon layer as a sacrificial layer, is initially applied, and this intermediate layer (17') is subsequently covered with a further separating layer (14'), at least in the exposed regions (23, 23').

65. (New) The method as recited in claim 64, wherein the intermediate layer (17') is grown from one of the group consisting of silicon, epipolysilicon, polysilicon, and conductive polysilicon.

66. (New) The method as recited in claim 64, wherein the further separating layer (14') is formed from thermally grown silicon dioxide.

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67. (New) The method as recited in claim 64, wherein the further separating layer (14') has a thickness of 10 nm to 100 nm.

68. (New) The method as recited in claim 64, wherein, due to a patterning of the further separating layer (14'), the intermediate layer (17') is not completely surrounded by the further separating layer (14') and a separating-layer section (14, 16).

69. (New) The method as recited in claim 64, wherein said method is adapted for producing sensor elements having free-standing structures (32).

IN THE ABSTRACT:

Please replace the Abstract with the following:

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A method is proposed for etching a first silicon layer (15) that is provided with an etching mask (10) for defining lateral recesses (21). In a first plasma etching process, trenches (21') are produced in the region of the lateral recesses (21) by anisotropic etching. The first etching process comes virtually to a standstill as soon as a separating layer (12, 14, 14', 16), buried between the first silicon layer (15) and a further silicon layer (17), is reached. This separating layer is thereupon etched through